

Lecture 01-17-20

Basics of a Camera

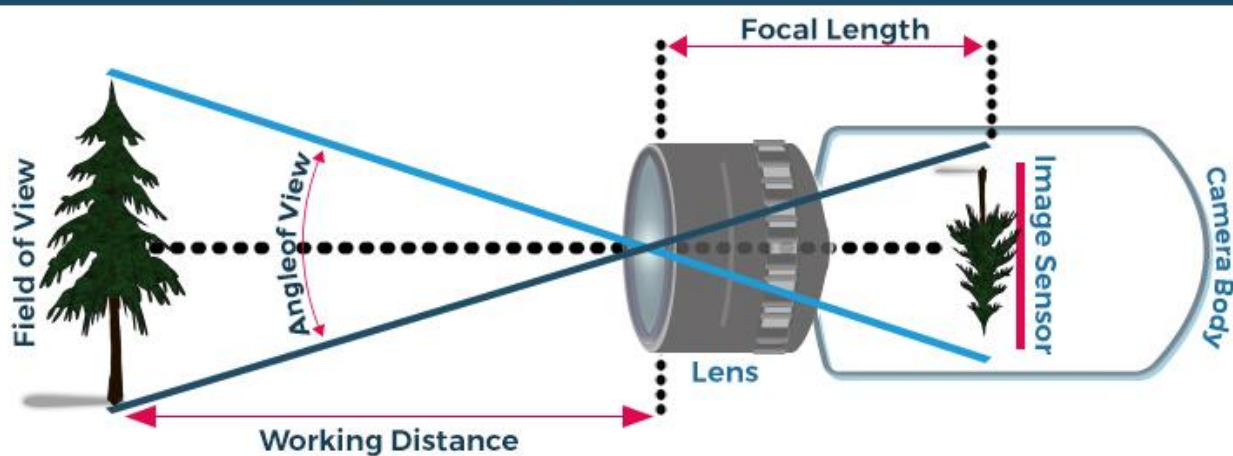
All Cameras Are Comprised of 3 Elements

- **Lens**
 - A camera lens isolates a portion of your scene depending on your focal length.
 - **Focal Length**-A technical measure of the distance from the iris inside the lens to the plane behind the lens where the projected image is in focus (written on the lens)
 - **Lens Classification:**
 - **Wide Angle (short focal length)**-Gives you a wide view of your scene
 - **Telephoto (narrow angle) (long focal length)**-Gives you a narrow view with the background magnified
 - **Zoom Lems (Variable-Focal-Length Lens):** A lens that changes a focal length from a short focal length (wide angle) to a long focal length (telephoto) (Narrow angle) in one continuous movie.
(<https://www.youtube.com/watch?v=mfshAzV0FN4>)
 - **Optical Zoom vs. Digital Zoom:**
 - In an optical zoom, the movable elements inside the lens change in focal length.
 - Typical zoom with a telephoto lens.
 - In a digital zoom, the center of the digital image is gradually magnified.
 - When zooming in using your cell phone camera on something far away.
 - **Iris:** The IRIS acts like your pupil. It opens and closes to let light into your camera.
 - **Lens Speed:** measured in F stops or T stops on cinema cameras. Refers to how much light can pass through to the imaging device.
- **Imaging Device**
 - **Beam Splitter**
 - Used in high end camcorders
 - It separates ordinary white light of the lens into projected image into 3 primary colors. (Red, Green, Blue [RGB])
 - Large camcorder use 3 sensors
 - 1 for the red beam
 - 1 for the blue
 - 1 for the green
 - **Sensor**
 - An imaging device that transduces light into an electric charge, which then makes it into a video signal.
 - The most common sensors are CCD (Charge-Couples-Device) and CMOS Chips.

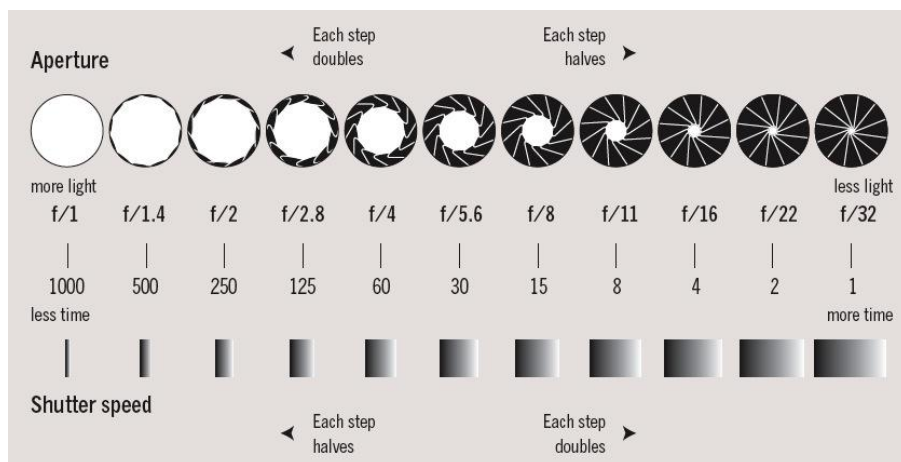
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- CMOS Chips are found in DSLR and Cinema Cameras
- **Shutter**
 - Controls motion blur in your footage.
 - How long the sensor is exposed for
 - Measured in fractions of a second.
 - Shutter angles
 - $1/50^{\text{th}}$, $1/120^{\text{th}}$, $1/250^{\text{th}}$
 - 180 degrees, 90 degrees, or 45 degrees
- **Viewfinder**
 - The eye piece on your camera
- **Monitor**
 - For viewing your screen

LENS FOCAL LENGTH

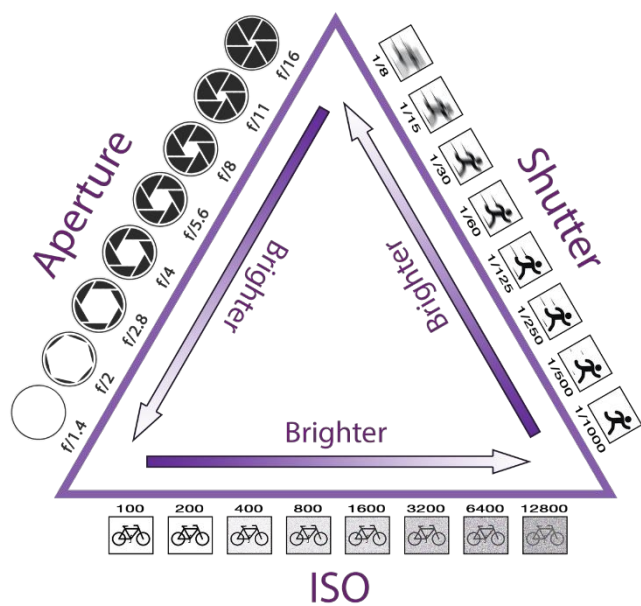
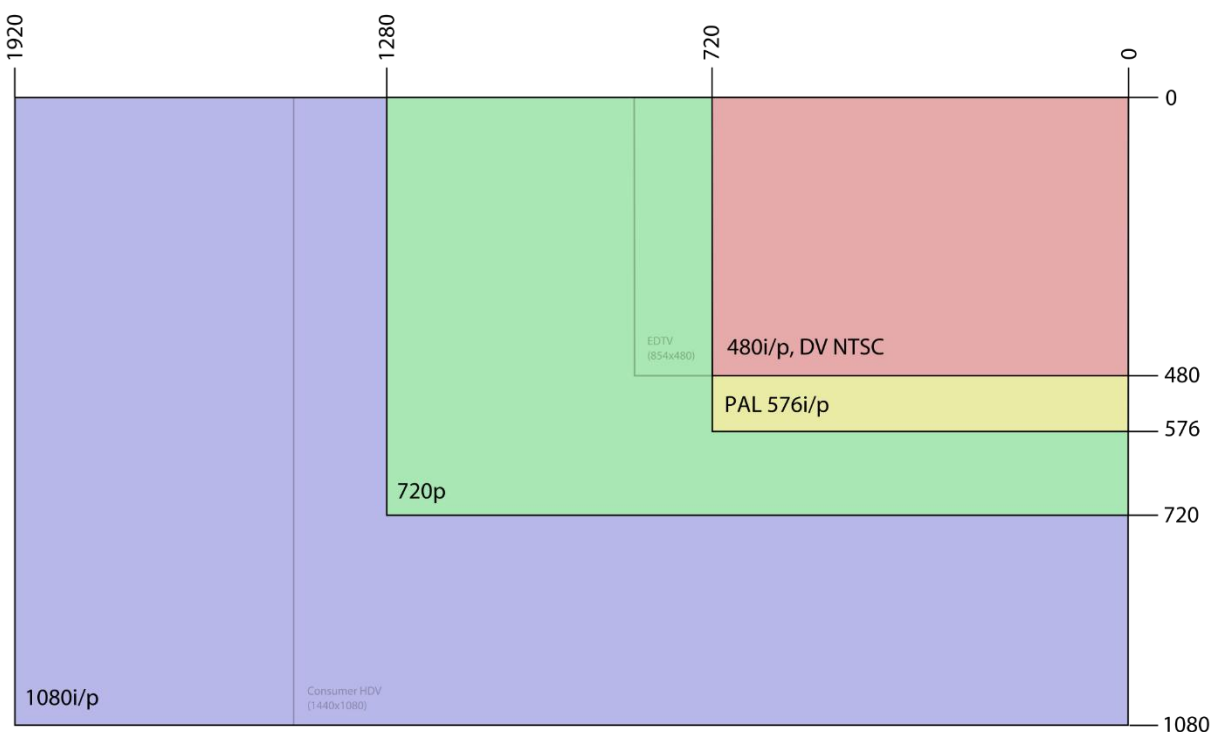


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Lens Aperture Chart
Video Size

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Shutter Speed: Controls how much light is let into your camera but also the depth of field.

Frame rate (expressed in **frames per second** or **FPS**) is the frequency (rate) at which consecutive images called frames appear on a display. The term applies equally to film and video cameras, computer graphics, and motion capture systems. Frame rate may also be called the **frame frequency**, and be expressed in hertz. ([Wikipedia](https://www.techsmith.com/blog/frame-rate-beginners-guide/))

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Aperture: controls how much light is let into your camera and the depth of field.

ISO: Controls a camera's sensitivity to light